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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/509,754

Applicant(s)

KISHIMOTO ET AL.

Examiner

KIMBERLY K. MCCLELLAND

Art Unit

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/30/08.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4 and 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4 and 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The corrected drawings submitted 7/30/08 are acceptable and overcome the previous objection to the drawings.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent No. 3,936,575 to Watanabe et al. in view of U.S. Patent No. 4,909,886 to

Noguchi and Japanese Patent Application Publication No. 07-288384 to Tamura et al.

4. With respect to claim 1, Watanabe et al. discloses a method of making metal-clad laminates, including laminating a metal foil on one face of a prepreg sheet; placing a mold-releasing sheet on another face of the prepreg sheet; heating and pressing a given place of the prepreg sheet and the metal foil via the mold-releasing sheet by a heat and press means, after the placing step; peeling off the mold-releasing sheet, after heating and pressing the given place; heating an entire face of the prepreg sheet and the metal foil after the peeling off step; wherein heating and pressing the given place are performed at a temperature higher than a softening point of a resin impregnated into the prepreg sheet (10, line 54-column 11, line 44). However, Watanabe et al. does not

specifically disclose the partial heating and pressing followed by heating and pressing the entire face of the prepreg and metal foil or the heating and pressing the given place are performed so that the resin to be kept in stage-B status, while the temperature and pressure of the pressing are set so that the resin is not hardened and not pushed out of the prepreg sheet at the given place.

5. Tamura et al. discloses a manufacturing method for wiring boards, including it is known in the art to apply partial heat and pressure during lamination and subsequently heating and pressing the entire face of the laminate (see Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the partial heat and pressing step taught by Tamura for the heating and pressing of the entire surface disclosed by Watanabe et al. and the heating and pressing the entire face of the laminate taught by Tamaru et al. for the drying step disclosed by Watanabe (column 11, lines 35-44). The motivation would have been to achieve the desired bonding strength between the metal foil and prepreg. Simple substitution of one known element (partial heat and pressing followed by complete heating and pressing of Tamaru) for another (Watanabe's roller heat and press device) would achieve the predictable result of localized bonding of the laminate.

6. Noguchi discloses a process for producing copper-clad laminate, including during lamination, the temperature allows the resin to be kept in stage-B status, prior to a final curing step (column 4, lines 32-43, column 5, lines 12-28; and column 6, lines 17-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and

pressing in the method disclosed by Watanabe et al. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

7. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,936,575 to Watanabe et al. in view of U.S. Patent No. 5,482,286 to Fujikake et al., U.S. Patent No. 4,909,886 to Noguchi, and Japanese Patent Application Publication No. 07-288384 to Tamura et al.

8. With respect to claim 2, Watanabe et al. discloses a method of making metal-clad laminates, including laminating a metal foil on one face of a prepreg sheet; placing a mold-releasing sheet on another face of the prepreg sheet; heating and pressing a given place of the prepreg sheet and the metal foil via the mold-releasing sheet by a heat and press means, after the placing step; peeling off the mold-releasing sheet, after heating and pressing the given place (10, line 54-column 11, line 44). Watanabe et al. also discloses the laminate is used to form printed circuit boards (See Abstract). However, Watanabe et al. does not specifically disclose laminating the other substrates to the copper clad laminate, the partial heating and pressing followed by heating and pressing the entire face of the prepreg after the mold release sheet is removed or the heating and pressing the given place are performed so that the resin is kept in stage-B status, while the temperature and pressure of the pressing are set so that the resin is not hardened and not pushed out of the prepreg sheet at the given place.

9. Fujikake et al. discloses a method of making printed wiring boards, including subsequently joining the board substrate, second prepreg, and second metal foil onto the copper clad laminate (column 2, lines 58-67). These steps include: laminating a board having a circuit pattern on the another face of the first prepreg sheet, after the peeling off step; laminating a second prepreg sheet on the board, after heating and pressing the second given place; laminating a second metal foil on the second prepreg sheet, after heating and pressing the third given place. It would have been obvious to one of ordinary skill in the art to combine the multilayer circuit board manufacturing steps taught by Fujikake et al. with the clad laminate making steps disclosed by Watanabe et al. The motivation would have been to effectively form a multilayer circuit board.

10. Tamura et al. discloses a manufacturing method for wiring boards, including it is known in the art to apply partial heat and pressure during lamination and subsequently heating and pressing the entire face of the laminate (see Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the partial heat and pressing step taught by Tamura for the heating and pressing of the entire surface disclosed by Watanabe et al. and the heating and pressing the entire face of the laminate taught by Tamaru et al. for the drying step disclosed by Watanabe (column 11, lines 35-44). The motivation would have been to achieve the desired bonding strength between the metal foil and prepreg. Simple substitution of one known element (partial heat and pressing followed by complete

heating and pressing of Tamaru) for another (Watanabe's roller heat and press device) would achieve the predictable result of localized bonding of the laminate.

11. Noguchi discloses a process for producing copper-clad laminate, including during lamination, the temperature allows the resin to be kept in stage-B status, prior to a final curing step (column 4, lines 32-43, column 5, lines 12-28; and column 6, lines 17-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and pressing in the method disclosed by Watanabe et al. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

12. In general, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to be not patentably distinguish the processes. *Ex parte Rubin*, 128 USPQ 440 (Bd. Pat. App. 1959). The separation of the partial heating and pressing steps from one step into four separate steps after each substrate is attached is not patentably distinct from a single partial heating and pressing step, unless new and unexpected results occur. It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform individual partial heating and pressing steps as taught by Tamaru after each lamination substrate of Fujikake, when combined with the metal clad laminate and releasing sheet of Watanabe, prior to a final total curing step using heat and pressure as disclosed by Noguchi for the reasons suggested above.

13. As to claim 4, Watanabe discloses a process of forming multilayer circuit boards, including the board having a circuit pattern is a composite of thermosetting resin and one of woven fiber or non-woven fiber (column 12, lines 22-28).

14. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,936,575 to Watanabe et al. in view of U.S. Patent No. 4,909,886 to Noguchi and Japanese Patent Application Publication No. 07-288384 to Tamura et al. as applied to claim 1 above, and further in view of 4,994,133 to Oizumi et al.

15. With respect to claim 7, Watanabe et al. does not specifically disclose the peeling off of the mold-releasing sheet peels off the sheet from one side of the sheet gradually and sequentially toward another side.

16. Oizumi et al. discloses a process for producing reinforced resin laminates, including the peeling off of the mold-releasing sheet (10) peels off the sheet from one end of the sheet toward another end (22/24; See Figure 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the gradual peeling step taught by Oizumi et al. in the laminating step taught by Watanabe et al. The motivation would have been to allow the release sheet to be reliably peeled and stored in roll form (22; See Figure 4).

17. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,936,575 to Watanabe et al. in view of U.S. Patent No. 5,482,286 to Fujikake et al., U.S. Patent No. 4,909,886 to Noguchi, and Japanese Patent Application

Publication No. 07-288384 to Tamura et al. as applied to claims 2 and 4 above, and further in view of 4,994,133 to Oizumi et al.

18. With respect to claim 7, Watanabe does not specifically disclose the peeling off the mold-releasing sheet peels off the sheet from one side of the sheet gradually and sequentially toward another side.

19. Oizumi et al. discloses a process for producing reinforced resin laminates, including the peeling off of the mold-releasing sheet (10) peels off the sheet from one end of the sheet toward another end (22/24; See Figure 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the gradual peeling step taught by Oizumi et al. in the laminating step taught by Watanabe. The motivation would have been to allow the release sheet to be reliably peeled and stored in roll form (22; See Figure 4).

20. Claims 1-2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of U.S. Patent No. 4,909,886 to Noguchi.

21. As to claim 1, applicant's admitted prior art discloses a conventional method of manufacturing double sided boards, including laminating a metal foil on one face of a prepreg sheet; placing a mold-releasing sheet on another face of the prepreg sheet; heating and pressing a given place of the prepreg sheet and the metal foil via [[the mold-releasing sheet by a partial heat and press means, after the placing step; peeling off the mold-releasing sheet, after heating and pressing the given place, and heating and pressing an entire face of the prepreg sheet and the metal foil, after the peeling off

step (See paragraphs 0004-0020 and Figures 5-7). However, Applicant's admitted prior art does not specifically disclose the heating and pressing the given place are performed so that the resin to be kept in stage-B status, while the temperature and pressure of the pressing are set so that the resin is not hardened and not pushed out of the prepreg sheet at the given place.

22. Noguchi discloses a process for producing copper-clad laminate, including during lamination, the temperature allows the resin to be kept in stage-B status, prior to a final curing step (column 4, lines 32-43, column 5, lines 12-28; and column 6, lines 17-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and pressing at a given place in the method disclosed by applicant's admitted prior art. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

23. As to claim 2, applicant's admitted prior art discloses a conventional method of manufacturing double sided boards, including laminating a metal foil on one face of a prepreg sheet; placing a mold-releasing sheet on another face of the prepreg sheet; heating and pressing a given place of the prepreg sheet and the metal foil via [[the mold-releasing sheet by a partial heat and press means, after the placing step; peeling off the mold-releasing sheet, after heating and pressing the given place, and heating and pressing an entire face of the prepreg sheet and the metal foil, after the peeling off step; laminating a board having a circuit pattern on the another face of the first prepreg sheet, after the peeling off step; heating and pressing a second given place for bonding

the first prepreg sheet and the board, after laminating the board; laminating a second prepreg sheet on the board, after heating and pressing the second given place; heating and pressing a third given place for bonding the second prepreg sheet and the board, after laminating the second prepreg; laminating a second metal foil on the second prepreg sheet, after heating and pressing the third given place; heating and pressing the at a fourth given place of the second metal foil and the second prepreg sheet; and heating and pressing an entire face of the first prepreg sheet, the first metal foil, the board, the second prepreg sheet, and the second metal foil after heating and pressing the fourth given place (See paragraphs 0004-0020 and Figures 5-7). However, Applicant's admitted prior art does not specifically disclose the heating and pressing the given place are performed so that the resin to be kept in stage-B status, while the temperature and pressure of the pressing are set so that the resin is not hardened and not pushed out of the prepreg sheet at the given place.

24. Noguchi discloses a process for producing copper-clad laminate, including during lamination, the temperature allows the resin to be kept in stage-B status, prior to a final curing step (column 4, lines 32-43, column 5, lines 12-28; and column 6, lines 17-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and pressing at a given place in the method disclosed by applicant's admitted prior art. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

25. As to claim 4, applicant's admitted prior art discloses a process of forming multilayer circuit boards, including the board having a circuit pattern is a composite of thermosetting resin and one of woven fiber or non-woven fiber (See paragraphs 0004-0020 and Figures 5-7).

26. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of U.S. Patent No. 4,909,886 to Noguchi as applied to claims 1-2 and 4 above, and further in view of 4,994,133 to Oizumi et al.

27. With respect to claim 7, applicant's admitted prior art does not specifically disclose the peeling off the mold-releasing sheet peels off the sheet from one side of the sheet gradually and sequentially toward another side.

28. Oizumi et al. discloses a process for producing reinforced resin laminates, including the peeling off of the mold-releasing sheet (10) peels off the sheet from one end of the sheet toward another end (22/24; See Figure 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the gradual peeling step taught by Oizumi et al. in the laminating step taught by applicant's admitted prior art. The motivation would have been to allow the release sheet to be reliably peeled and stored in roll form (22; See Figure 4).

Response to Arguments

29. Applicant's arguments with respect to claims 1-2, 4, and 7 have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments are

primarily based on the newly added limitations to independent claims 1 and 2.

Applicant's remaining pertinent arguments are addressed below:

30. Applicant's arguments are primarily based on the lack of anticipation of any single reference over the claims as a whole. However, these arguments are not persuasive. Applicant is reminded the rejections of claims 1-2, 4, and 7 as obvious are under 35 U.S.C. 103(a), not anticipation under 35 U.S.C. 102 (b). Therefore, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

31. In response to applicant's arguments that none of the prior art references specifically disclose localized heating a pressing while maintaining the laminate in a b-stage status, examiner notes Tamura and applicant's admitted prior art are relied upon to teach heating and pressing at a given place. Noguchi, a secondary reference, is relied upon to teach preliminary lamination under heat and pressure prior to curing the laminate completely to a c-stage status. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and pressing at a given place in the method disclosed by the prior art. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

32. In response to applicant's argument that the prior art does not specifically address the problem of resin being pushed out during lamination, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences

Art Unit: 1791

would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Newly cited Noguchi discloses it is known in the art to use a two stage laminating and curing process to prevent dimensional change and warpage. The benefits resulting from the two stage heating and pressing would also naturally result in resin not being pushed out during lamination. Therefore, the above combination of familiar elements, such as localized heating and pressing along with a two stage lamination and curing process, according to known methods taught by applicant's admitted prior art and Noguchi yields the predictable result of preventing dimensional change due to resin melting and flowing away from the laminate. The current rejection is based on a combination of teachings in the prior art. Examiner recognizes none of the currently cited references anticipate the currently claimed invention. However, a patent may not be obtained though the invention is not identically disclosed or described, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains (See 35 U.S.C. 103 (a)). The teaching of Noguchi of a two-step lamination and curing process is combined with the known localized heating and pressing of the prior art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the b-stage laminating step taught by Noguchi during the heating and pressing at a given place in the method disclosed by the prior art. The motivation would have been to prevent dimensional change and warpage of the copper clad laminate (column 3, lines 5-10).

Art Unit: 1791

33. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

34. Applicant's remaining arguments are based on the dependency of claims 4 and 7. These arguments are not persuasive for the reasons set forth above. Consequently, the rejections are maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY K. MCCLELLAND whose telephone number is (571)272-2372. The examiner can normally be reached on 8:00 a.m.-5 p.m. Mon-Thr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip C. Tucker can be reached on (571)272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1791

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 886-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. K. M./
Examiner, Art Unit 1791

KKM

/Philip C Tucker/
Supervisory Patent Examiner, Art Unit 1791